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[Communicated.]

PRESERVATION OF TIMBER.—We understand that Dr. EARLE's method of preserving Timber (the merits of which are so well attested,) is being extensively employed under authority of the War Department.

We insert with pleasure, the following communication of Mr. Ward, as it enables us to remove a misapprehension, existing in the mind of that gentleman, which is certainly calculated to do us and others, injustice. At the same time we are glad to find that Mr. W. has taken our remarks in good part.

Our sole object, is to elicit truth, and to avoid error—we shall therefore insert the communication, and append such remarks as we consider necessary.

To the Editors of the American Railroad Journal and Mechanic' Msagazine.

GENTLEMEN:—The first May number of your Journal, contains some remarks upon a letter of mine, published in a previous number, in which I made some comments upon Professor Renwick's paper "on the steamboats of the United States of America:" and I fear I am doing you injustice by treating these remarks as your own, but I see no way of avoiding that, as you have endorsed them "editorial." To some of these, I wish to make a brief reply. I pass over what is said about "warmth of manner," and "sweeping assertion, not borne out by practice," and proceed to your remark "to render this table complete, we should have the average velocity of the vessels—the number of strokes per minute, and the area of the immersed portion of the transverse section. We should then be able to form some idea of the proportion of the engines to the vessel, and of the amount of power expended in obtaining high velocities. Without these elements, the comparison to be fair, should only be between vessels having the same size, and moving at the same rate. We should then be better able to oppose 'facts and theory.'" Now, with regard to the table, I must beg you to examine it again, and I think you will find it was only design-

ed to show the rate of consumption of fuel in different engines, to procure a given amount of power—a matter which has no connection whatever with the size, or form, or velocity of the vessels containing the engines, and which could have been done just as well if each engine had been employed at a different kind of work. If to produce the power of one horse in one engine, it requires three times the amount of fuel that it does to produce the same amount of power in another engine, no change of size or form or speed of the vessel containing them, could affect the rate of consumption. And if you will attentively examine the table, you will find the amount of fuel required to produce a given amount of power, in each of the engines named, is clearly set down.

You have next made some remarks upon the practice of working steam expansively, and quoted some opinions in its favor. On this subject, I have only to say, that so far from denying its advantages, I said nothing about it in my former letter, and am decidedly in favor of the practice, on account of its economy. But I take the liberty to add, that *all* its advantages may be obtained without resorting to the dangerous pressure of 57 lbs. per square inch, or even venturing into its neighborhood.

Your criticism upon the inference that Prof. Renwick supposed something else than the "mere pressure of steam," is generally the cause of explosions I am obliged to let pass, for the reason that I am entirely unable to understand them. In your concluding paragraph, you say, "the testimony of almost all practical and well informed men is, that the *mere* use of steam of 40 or 50 pounds pressure per square inch, as in locomotive boilers, etc., is not the *cause* of danger; and that the use of such pressures in boilers of competent strength, skilfully managed, is less dangerous, if not more economical, than a low pressure, depended upon as safe, merely because it is a low pressure." With regard to this, I have to remark, that if nearly thirty years attentive study of the steam engine, and no inconsiderable practice in the building and management of it during that time, entitles any one to be called a practical man, I have some claim to that appellation. And during the time I have been connected with the steam engine, I heve been acquainted with no inconsiderable number of practical men in this country and abroad, and nineteen twentieths of all that I have known, have been clearly of opinion that "the mere pressure of steam," is abundantly sufficient, to cause the explosion of steam boilers, however well they may be made, or however skilfully and carefully the engines attached to them, may be managed.

I am, gentlemen, your obt. servt.

JOHN D. WARD.

Novelty Works, 15th May, 1840.

In the first place, we wish to disabuse Mr. Ward of an error, into which he has fallen in regard to the authorship of the remarks here commented upon. In his communication, it will be perceived that an insinuation is thrown out that we have "endorsed as editorial," that which has been written by another, either wholly or in part.

We now most unequivocally assert, that the remarks in question were written by the editor without any consultation, advice, or instigation from any person, that they were the result of his own convictions upon first reading the communication of Mr. Ward, and were seen by no one, save by his partner, the printer of the Journal, until printed.

We may likewise state, that the remarks by "an Engineer," in the last number of the Journal, (not yet published, when the above communication was received,) were written before our own notice could have been seen by the writer—before we had either seen him or spoken with him on the subject, and we were ourselves surprised with the coincidence of our views—in several instances having turned to the same authority, in confirmation of our respective opinions.

This much being premised we proceed to notice the several objections taken to our criticisms. In the first instance, it will be seen, that the difficulty lies in the different value given to the estimated horse power. What we mean to assert is this, that the horse power estimated from the size of the cylinders, etc., is not in all cases the expression for the real and effective power of the engine, and that particularly where high velocities are aimed at, the consumption of fuel is far beyond that of the engine working at the highest useful velocity. In other words, and to illustrate our meaning the better, we mean to say, that of two boats precisely equal in all respects, the one obtaining the highest possible speed, will burn more fuel, in travelling a given distance, than the one travelling at a certain rate beneath that of the first. Is it not a well known fact, that in racing at the top of their speed, our steamboats consume more fuel than when going the same distance at their ordinary velocity?

We had considered this fact to be universally conceded, and it was to this we referred, when pointing out what to us seemed a deficiency in Mr. Ward's table. We conceive that a fair comparison cannot be made between the estimated horse power of the Great Western, etc., working at the most economical velocity, and that of our North river boats, working beyond the most economical velocity, and burning cords of wood to gain an extra mile per hour.

If authority in this case is needed, we refer to the experiments of Pambour, in which an engine working its maximum at a fixed pressure, (or nearly so,) uniformly decreased its velocity in inverse proportion to the increase of load, caused by a greater amount of ascent in the road. Pambour also adds a caution, that the velocity, among other things, be taken into account, in estimating the horse power of locomotive or any other sort of engines. In view of this very case, Mr. Stephenson estimates the horse power of one of the very boats named in the table in question, so high as to give quite a different result in the economy of fuel. (See the article in the last number of the Journal.)

It will therefore be granted, that if this is a correct view of the matter, the speed size and form of the vessels, are, one or all of them necessary el-

ements in such a table. And that this is a correct view, we can hardly conceive will be questioned by any one.

In the next place Mr. W. admits the economy of working steam expansively, and disclaims any intention of doubting it, but adds, "that *all* its advantages may be obtained without resorting to the dangerous pressure of 57 pounds per square inch, or even venturing into the neighborhood." It will be found, by a careful examination of the authorities brought forward in our remarks, that the best effect, in point of economy, was found to result from using steam, certainly not far from a pressure of 57 pounds, if not in its immediate neighborhood. It is unnecessary to particularize, but it will be found that the pressure named varies from 45 or thereabouts, to 50 or more lbs. per square inch. The very nature of the laws of steam will point out the greatest economy to be derived from the use of steam of high pressure, the limit, of course to be dependent upon the strength of the boiler.

It appears that our criticism of the writer's misinterpretation of the word "mere," as used by Prof. Renwick, were unintelligible. We must confess that we did not render the matter more clear, by attempting to explain what was clearly self-evident. We meant to say, that the word mere was wrongly translated, and by a substitution of other words than those used in the passage quoted, to show that such interpretation, involved an absurdity.

As to the opinions of practical and well informed men, we have only to say, that we quoted such authority as we could find—papers sanctioned by the Institution of Civil Engineers—the appendix to a memorial signed by nearly all the gentlemen concerned in steaming on our waters. This, however, is matter of opinion, and every one has a right to his own; we wish, however, such a consideration of the facts in question, as shall bring about, at least an approximation of opinion, and we feel convinced that there must be some misapprehension in the mind of the writer of the foregoing communication, which has led him into an untenable position.

As we have said before, our sole object, is to get at the truth, and we have therefore devoted more time to the explanation of our remarks, in the hope that misapprehension may be removed, and the subject in dispute narrowed down to the true point in question.

To the Editors of the American Railroad Journal and Mechanics' Magazine.

GENTLEMEN:—I observe that three of your correspondents, have lately assumed positions respecting the crank, that if proved, would annihilate the whole theory of mechanics, and lead directly to a perpetual motion.

The first gentleman, vol. x, page 161, argues that when the power acts in parallel lines, 0·2146 of the power is lost by the use of the crank.

The second, vol. x, page 205, shows by a numerical calculation that this is not exactly correct, but that when we use a connecting rod "there is necessarily some loss, to obviate which, the connecting rod is made as long as possible."

The third, vol. x, page 241, says, that "the force in passing from its primitive direction, to its final direction in the tangent to the rotary circle of the crank must evidently lose two proportions," etc.

Now, there can be no *expense* where there is no motion. We may raise a weight by any of the mechanical agents, and the weight multiplied by its velocity, will at all times equal the power applied, multiplied by its velocity.

When the active power ceases, there is no more *expense* of power, however great may be the inert force that is required to retain the weight in its position.

Thus, in the crank, and in the combination of the crank and connecting rod, there is an inert resistance required of the guides and of the centre of the crank motion; but as these remain fixed, with respect to the rest of the machine, they cause no *expense* of power, but merely enable the power to be diverted from its original direction to that in the direction of the tangent. Consequently, the whole expense, (except friction) is caused by the direct resistance of the pin, multiplied by the distance through which it acts. This being the total effect, if it be less than the power expended, we may gain by reversing the action, and converting a circular into a rectilinear motion, and consequently construct a perpetual motion.

But since this "*reductio ad absurdum*" rests upon the basis, that a perpetual motion is a mechanical impossibility. And since this assumption may be denied, and the solution therefore rendered unsatisfactory, we will take a positive demonstration.

In the first case, where the power acts in parallel lines, we have precisely the condition of gravity causing the descent of a heavy body on a curved inclined plane. Here it has been generally conceded that no power is lost. But since this has also been disputed, we take another more conclusive mode of investigation.

Let P=the original power, f=the force in the direction of the tangent, V=the velocity of P when v=the velocity of f, and c=the angle included between the crank and the direction of P.

Take the first case where the power acts parallel.

$$P : f :: \text{Rad} : \sin.\ c.$$
$$V : v :: \sin.\ c : \text{Rad.}$$

$P\,V = f\,v$. But $P\,V$ is the expense of power, and $f\,v$ the effect, therefore we see that there is no loss.

Again, with the connecting rod as usually applied. Let d= the angle of departure of the rod from the line of the original direction of the power, p=the force in the direction of the rod. Then, by the resolution of forces, we get $p = P \times \sec.\ d$=the force in the direction of the rod, and by resolving p, we get a force=P acting on the pin parallel to the original direction.

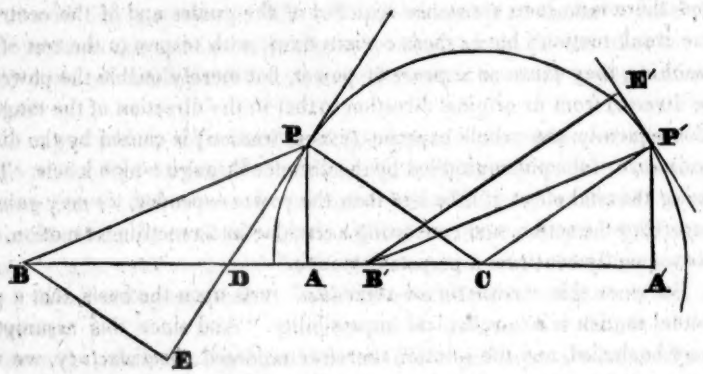
Since, then, it is both equal and parallel, we find that the rod merely transfers the power from the coupling box to the crank pin, without

loss, and we may there compound or resolve it in the same manner as if immediately applied at the pin; in which case, we have already seen that there is no loss of power. Therefore, there is no loss of power, either from the circular motion of the crank, or the diagonal action of the connecting rod.

Having thus reviewed the remarks of these gentlemen, I will present for their investigation the following formula, to suit all conditions of crank and connecting rod.

$$f = P \times \text{sec. } d \times \text{sin. } (c \pm d)$$

The positive sign belongs to the 1st and 4th, and the negative sign, to the 2d and 3d quadrants.



Demonstration.—Let C be the centre of the crank, P the position of the pin, and B the position of the coupling box. P E a tangent to the circle described by the pin, touching at P, and crossing B C the line of the direction of the power, at D. B E perpendicular to P E, and P A perpendicular to B C. (The pin P being in the first or fourth quadrant.) Then if B A represent the power, B P will represent the force in the direction of the rod, and B P being resolved, gives E P in the direction of the tangent $=f$. Therefore, the power B A produces the force E P.

P C and B E are both at right angles to P E, and therefore parallel to each other, consequently

$$D\,B\,E = P\,C\,A = c,\quad B\,P\,E = D\,B\,E + D\,B\,P = c + d,$$

calling B A radius, we have B P=secant d, consequently, the force B P= P × secant d.

When B P=radius, then E P=f=sin $(c+d)$ therefore,

Rad. : P × sec. d : : sin. $(c+d)$: f=P × sec. d × sin. $(c+d)$.

We have, thus, the first part of our formula, or that part for the first and fourth quadrants.

For the opposite semi-circle, use the same letters accented, to signify the same relative points.

Then, because E′ B′ and C P′ are parallel, the angle E′ B′ A′=P′ C A′, therefore E′ B′ P′=P′ C A′—P′ B′ A′= $(c-d)$.

Then as in the former case, calling B′ A′=radius, we get B′ P′=secant d, and when B′ P′=radius then E′ P′=f=sin. $(c-d)$. Therefore,

Rad. : P×sec. d : : sin. $(c-d)$: f=P×sec. d×sin. $(c-d)$.

This gives us the second part of our formula, or that for the semi-circle opposite the power, and by combining the two, we get,

f=P×sec. d×sin. $(c\pm d)$. Q. E. D.

Carollary I.—If the length of the connecting rod be infinitely great, the power acts in parallel lines, the angle d becomes 0, and consequently when c is the same in each quadrant, f is also the same, and therefore each quadrant receives an equal amount of force.

Corollary II.—When the length of the rod is infinitely great, then f becomes a maximum when sin. c becomes a maximum=sin. 90°=radius =1, we have then f=P×1×1=P.

Corollary III.—When the length of the connecting rod is a maximum, equal the length of the crank, then $c=d$, and the formula becomes f=P× sec. c×sin. $(c\pm c)$. Hence, in the second semi-circle f=P×sec. c× sin. 0=0. Therefore no power is communicated during the second semi-circle, and consequently the intensity of the force during the revolution through the first semi-circle, is doubled by the connecting rod, and at the same time the piston moves through the diameter of the crank motion.

Corollary IV.—The longer the connecting rod the more uniform will be the force, for the longer the rod the less the angle d, and consequently the less the force subtracted from the second semi-circle, and added to the first.

Corollary V.—Since the effect is equal to the expense of power, we have under all these conditions $v=\frac{V\,P}{f}$.

Friction.—In all these cases, we have supposed a perfect machine, working without friction, and found that we neither lose power by the circular motion of the crank, nor yet by the diagonal action of the connecting rod. But when we introduce friction, the question assumes quite a different appearance, and we here discover the reason why the connecting rod should be made as long as the machine will admit, for the purpose of reducing the *loss* of power by friction. B A being the direction and intensity of the power, A P is the force with which the coupling box rubs against the guide. When the power acts in parallel lines, this loss does not occur, but when the rod is short it becomes very serious. AP being the tangent to the angle d, if the rod be a minimum the friction will become almost infinite as the box approaches the centre. Besides, during one revolution, this friction acts through twice the diameter of the crank circle, while the friction on the pin when the power is parallel, is not only less, but acts only through the circumference of the pin.

Again, the force B P being the secant of d, is always greater, than B A the radius, except at the dead points, and increases to infinity or nearly so, when the rod is a minimum.

Hence we find that on the score of friction, it is highly important to make the connecting rod long, and in most cases it is equally important to increase the length, in order that the mechanical force may be as uniform as possible, although theoretically no power is lost.

To reduce these infinitesimals to positive and definite numbers, may afford employment for the industrious, but they will be of no practical utility. The proper mode of ascertaining the loss from friction, is that pursued by De Pambour; to subject the engine to direct experiment.

One of the gentlemen whose words I have quoted, refers to the defects in De Pambours formula, and shows that a uniform loss from the crank, will not remove the difficulty.

I will add, that if we reject the formula and take the experiments, we will find in them, a proof that there is no loss from the crank.

This practical demonstration, is too long and intricate for the present article, for I have found, that after reducing the most difficult part of the investigation to a tabular form, and combining several operations, there still remains upwards of thirty distinct calculations, before we can predict the pressure in the boiler, and the amount of fuel, to effect a given velocity, with a given load, under the ordinary circumstances of high speed.

Of this we shall have more hereafter.

Yours, respectfully,

B. Aycrigg, *C. E.*

New York, June, 1840.

To the Editors of the American Railroad Journal and Mechanics' Magazine.

Engineer's Camp, Line of the Central Railroad of Georgia, *April*, 1840.

Gentlemen:—The frequent accidents occurring to cotton trains on railroads, from fire, has led me to bestow some little thought on a method for remedying the evil. The plan that I shall suggest, will at least have the advantage of simplicity, which is too often lost sight of.

Various descriptions of cars have been used for the purpose of carrying cotton, some close, and some open, with a canvass covering for the cotton. The latter being thought by many persons, superior to the former, from the readiness with which the fire is detected and extinguished. But as this description of car does not answer as well for other kinds of freight, and I very much question whether they are as safe for cotton, it is not probable they will be extensively used. The kind commonly in use, is the, so called, close cars; but unfortunately they have generally but a poor title to the name—however tight they may have been originally made, by tinning, tongueing and groving, and buttoning; the motion soon working the joints loose.

To open the door of the cars occasionally, while in motion, for the purpose of examining, would, it is evident, lead to the very result intended to be avoided, even if it were convenient. The object, then, is to communicate with the interior of the cars, without leaving open any space for the fire to

enter at. That fire does not spread rapidly when communicated to cotton in bales, is a well known fact. An instance lately came under my observation, where the cars ran half an hour after the cotton was on fire, in one of them (having been smelt by a passenger) without any serious result; a single bucket of water being sufficient to extinguish it. Therefore, if discovered at an early stage, it can be easily controlled; and the plan which I shall propose, will, I think, lead to an almost instant detection of it; and long before the smoke would find its way through the cracks, and diffuse itself through the atmosphere, so as to be detected in that way, in too many instances it having been discovered too late to prevent a conflagration.

The plan is, to have a hole through the top of each car, say one inch in diameter. To this hole is to be fitted a valve, attached to the end of a spring beneath the roof of the car; the spring may be a flat straight piece of steel, say nine inches long, and the valve may be of cork or wood, attached to the spring by a screw, with a large flat head, if the former, passing through into the spring. The valve should be so made as to come flush up, when closed, with the top of the roof, to keep water out of the hole; it should be made tapering, and also the hole, so as to make the motion easy, and to insure the valve setting tight. Next there is to be a tin tube, say about four feet long, the diameter a little larger than that of the hole. A single tube will answer for a whole train. This tube is to be placed over the valve in each car, from time to time—having a point projecting about an inch to throw the valve open--and if there is any smoke in the car at the time, its levity will cause it to rise instantly through the tube, when it will be detected by the *smell*. One of the hands that necessarily go with the cars, for the purpose of oiling, etc., can attend to this duty when the cars are under way, so that the *expense* may almost be set down at *nothing*.

It might be well to have the roofs of the cars made to project a little, so as to facilitate stepping from one to the other.

Yours, truly,

F. P. H. Assistant Engineer.

For the American Railroad Journal, and Mechanics' Magazine.

IRON VESSELS.

Though this age is often condemned for a too great desire of innovations and experiments, not only in morals, but in arts, yet it will be found upon examination, that *upon* this desire rests its claim, and its right, to be called "the age of improvement." Though this mania for patents, and rage for new applications of the mechanical powers, bring with them, much that is to be lamented, and much that is crude and unphilosophical, and though they tend to multiply the number of those mechanical sciolists, who regard nature and her laws of little importance in the construction of machines, and think that long continued courses of experiments, without reference to *fixed mechanical principles*, will supply a deficiency of knowledge, yet with this evil there is *some good*, with this superficiality there is some deep sci-

ence, and though there are thousands of ignorant smatterers, the age has nevertheless, produced an Arkwright, a Watt, and a Smeaton.

No art which ministers to the convenience and comfort of man, is more indebted to scientific discovery and scientific improvement, than the art of navigation. When we turn our eyes to the ancients and see that weakness and imperfection of their vessels, which compelled them to creep timidly and carefully along the coast of an inland sea, to which they were almost entirely confined, and then look at the art in our day, and see the beautiful model of the packet "walking the waters like a thing of life,"—the solidity of the frigate, defying the wind and the waves—and still more wonderful, the ocean steamers "shooting backward and forward between great continents, like shuttles weaving the world into one great web," we may well be proud of our age, and with reason boast of that superiority in the mechanic arts, which has almost enabled man to make the "winds and the waves" a subjugated part of his domain.

With these trite remarks, we come to a consideration of our subject. The use of iron in the construction of vessels is comparatively a modern invention, dating back not more than eight or ten years. Little has been written upon the subject, but not a little has been *accomplished.* Already iron steamers are used on the Niger, the Ganges, and the coast of Great Britain and France, and one has crossed the Atlantic. Two centuries ago man *might* have believed that vessels could be propelled by steam, but he would have found it difficult to believe that *iron* would be the material of which they would be constructed. He would have supposed that only the *Prophet's* miraculous power, could make iron to swim.

The construction of iron vessels has been almost entirely confined to Great Britain; and *there* even now, the expense of building a vessel of the same tonnage of wood, is but little less than that of building of iron. Owing, however, to the novelty of the invention, and perhaps to the prejudice which favors long established usages, and rejects innovation, it has not *yet* come into very general use; still we are of opinion that *very soon* in England and France, and *eventually* throughout the civilized world, it will supercede the use of wood. Before we proceed to show the advantages accruing from the use of iron as a material for the building of vessels, we shall remove the chief, and indeed only objection against it, by saying that from experiments accurate and conclusive, it has been ascertained that if iron be kept well covered with tar, it will suffer no injury from the corrosive power of sea-water. At a small expense, this can be done, and thus the only cause which can produce decay in the vessel, is removed.

The numerous advantages which have appeared, even in the short time since the first trial was made, are sufficient to convince the unprejudiced mind, of the advantage of the use of iron vessels.

First.—The vessel may be divided into a number of compartments, each of which is "water tight," and should the vessel sustain an injury in one or more of them, the remainder would possess buoyancy sufficient to keep it afloat. This is a desideratum which cannot be obtained in the case of ves-

sels built of wood, and if there were nothing but this fact to recommend iron to general use, it would be an argument strong enough and convincing enough.

Secondly.—Paradoxical as it may appear, it is nevertheless true that an iron vessel is lighter by nearly one half, and consequently draws much less water, than a wooden one of the same dimensions. On the Niger and other rivers they are used where other vessels of the same size could not be, and for shoal navigation are undoubtedly superior to all others.

Thirdly.—In the torid zone subjected alternately to the burning heat of the mid day sun, and the heavy night damps and rains of such climates, a vessel constructed of wood soon decays, or else from expansion and contraction of its parts soon become unseaworthy; but iron is subjected to no such decay and no such expansion from the *climate.*

Fourthly.— Iron vessels may be built stronger and tighter than wooden ones—they are secure from fire which so often destroys the *steamer*—the devouring element has no power over *them* and the "leak at sea," which fills every heart with terror and dismay is not to be dreaded.

Lastly.—An iron vessel may be constructed and taken in pieces and conveyed to any part of the globe, and again put together, at a very little expense, compared with one of wood. Several years ago, one was built at Manchester—sailed up the Rhine as far as was practicable—was then taken in pieces and conveyed to Lake Zurich in Switzerland, at a less expense than it could be constructed for *there.*

In case of a war on our inland seas, a fleet might be constructed at a national foundry, secure from all attacks from the enemy, and conveyed to the seat of war at a very small expense.

Such, imperfectly sketched, are some of the advantages, attendant upon the use of iron vessels. Should we succeed in calling the attention of scientific engineers to the subject, we shall be amply satisfied. We believe that at some future day, iron will be the *sole* material in the construction of navies. In Europe, already the scarcity of timber is felt, coal has long taken the place of wood; and man finding the *outward* resources of the earth failing, has discovered still richer and more abundant *internal* treasures. In our own country, too, we shall experience the same thing. Our forests are daily disappearing before the industry of the backwoodsman; we are daily compelled to seek for new materials and new complications of mechanical power to minister to our comfort and our luxuries, and the time is not far distant, when *here*, as in the Old World, our resources must be obtained from the bowels of the earth.

To the Editors of the American Railroad Journal, and Mechanics' Magazine.

GENTLEMEN—A severe illness, which left my eyes for several weeks in a state which required me to make the least possible use of them, prevented my conplying at an earlier date with the request of "*an early friend to railroads,*" in your Journal of November last, that I would furnish the drawings and description of the chair and rail which I have introduced on the Eastern railroad from Boston to Portsmouth N. Hampshire

I have now the pleasure of forwarding a drawing which presents plans and sections of the joint and centre chairs, together with the rail, key and dowel, as above requested. The chief improvement upon the old chair and rail, and the T rail, is in the greater elevation, (some three or four inches) at which it places the top of the rail; the height of chair and rail being 7¼ inches, and as the sleepers or ties are covered with about three inches of gravel in the centre, and two inches under the rail, the top is five or six inches above the covering. This elevation I have found to relieve the road from all interruption in three-fourths of the snow storms which have occurred the two winters' experience which we have had with it, and it is obtained without greatly increasing upon the weight of the old chair, chiefly by having the centre chairs about two-thirds the width of the joint chair, instead of having all of the same width as formerly;—and by cutting off the inner end of the chair, and lengthening that which is to be placed outwards, to make the angle of leverage even less than with the old chair. They weigh about 23 and 17 lbs. each, giving, with six to each rail of 18 feet in length, an average of less than 18 lbs., the old chair weighing generally about 16 lbs. The rails weigh 46 lbs. to the yard, and have dowels which fit tightly at the joints, and are secured in the chairs by a single key which is bent or clenched after it is driven.—With this arrangement, and having the distance between the joint sleeper and the one next to it, a foot less than the other distances, an unusual degree of firmness is secured at the joints. Although we have experienced no inconvenience from any longitudinal movement of the rails, yet I have had check holes formed in every third or fourth rail, into which a check of five-eighths iron, two inches in length may be inserted to bear against the adjoining chair and prevent such a movement. With regard to the key which this rail requires, I have found, after several years experience, that where the sleepers are of wood, from the elasticity which it gives to the track, they do not come out, except to a very trifling extent, and are not at all objectionable. Compared with the T rail, which is very generally in use, this chair rail possesses great advantages, particularly where snow and ice, and indeed any obstacles are to be encountered. It permits a freer drainage of the track; it is much firmer, the angles of leverage being less, and the supporting base greater than with the T rail, and of course admits of greater speed without injury to the track. It allows the sleepers to be well covered, which very much improves the appearance of the road and increases also its firmness. It is more readily removed for repairs, &c., and without injury to the sleepers, as in removing the T rail. It is more easily and perfectly manufactured, and its cost is not greater.

The T rail, which is generally laid like the other with ties about every three feet, will support a greater weight without deflection, but having found this chair rail fully sufficient as to strength, running engines of from nine to about twelve tons weight, mostly at a speed of 25 to 30 miles, and more the hour upon it, I deem this additional strength superfluous.

J. M. F.

Fig. 1.

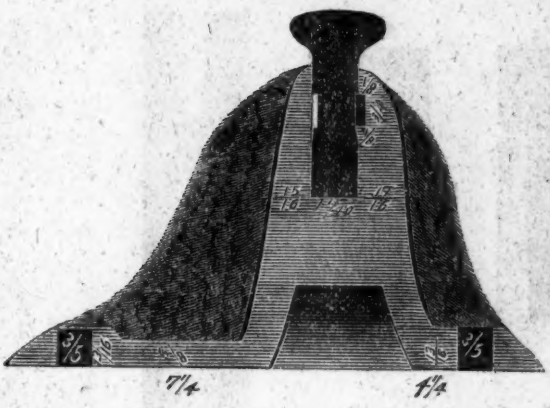


Fig. 2.

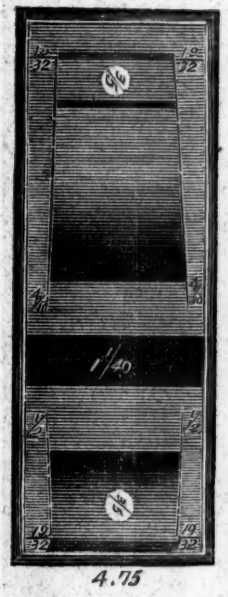


Fig. 3.

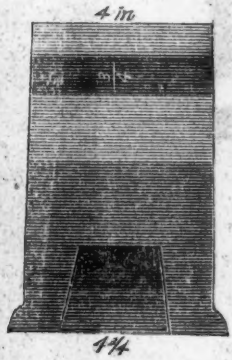


Fig. 4.

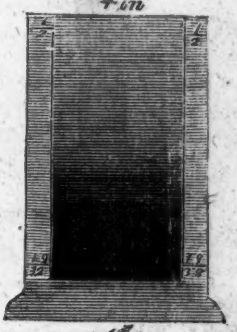


Fig. 5.

Fig. 6.

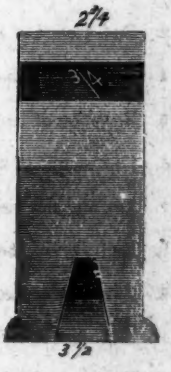


Fig. 7.

Fig. 8.

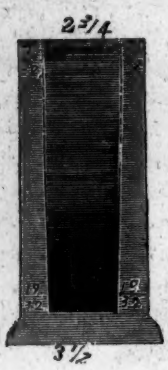


Fig. 9.

Fig. 10.

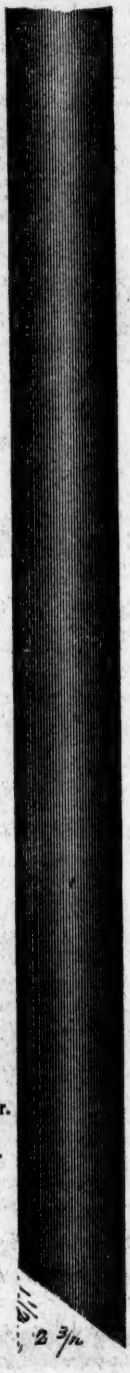


Fig. 11.

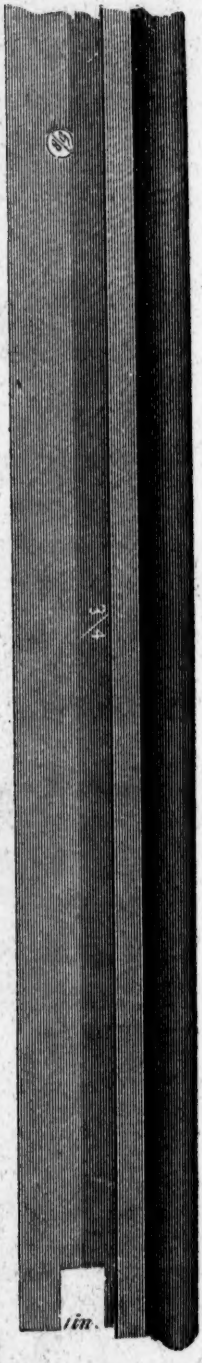


Fig. 12.

Fig. 13.

Explanation of the Cuts.

Fig. 1. Side section of joint chair.

" 2. Plan of joint chair.

" 3. End section of joint chair.

" 4. Elevation of short end of joint chair.

" 5. Elevation of long end of joint chair.]

" 6. End section of centre chair.

" 7. Top and side view of wedge.

" 8. Elevation of short end of centre chair.

" 9. Elevation of long end of centre chair.

" 10. Top view of rail.

" 11. Elevation of rail.

" 12. End view of rail.

" 13. Elevation and end of dowel.

To the Editors of the American Railroad Journal and Mechanics' Magazine.

GENTLEMEN:—I was somewhat surprised, to find in your number published on the 15th inst, a paper signed "*An Engineer*," the writer of which appears to have been highly offended at the liberty taken by myself with Professor Renwick's account of the steamboats of the United States; and he takes the opportunity to read me a very edifying homily upon "a proper spirit, and facts sufficiently strong." These are undoubtedly necessary in properly discussing any subject, and where one of the parties engaged is nearly, or quite destitute of both, the other must supply the deficiency, if any good results from the discussion. To this paper I feel bound to make some reply: but as I have no other object, in doing so, than to place the matters in question in their true light, I shall avoid any remarks not having a direct bearing upon them. I am bound, first of all, however, to plead guilty to the "Engineer's" charge of delay.

But, as he appears quite displeased with my remarks, now they have appeared, I am somewhat surprised that I am charged with criminal neglect, in not sending them forth at an earlier day. In extenuation of the fault, I beg leave to say, that I am not so fortunate as to obtain every English work immediately on its publication, and also, that at the time of receiving this, (which was several months since,) a serious accident, rendered me unable, even to read, much less write comments upon any portion of it. The next thing which "an Engineer" complains of, is the table showing the consumption of fuel by different engines, and says, "the things in this table which are stated as facts, are not only contradicted by every valuable work on the steam engine and by practical experiment, but by the authority of the English, and by the words of the great perfector of the engine, Watt." He then proceeds to show that I know nothing of the English method of calculating the power of a steam engine, and prove it, by refering to "page 146 of Stephenson's Civil Engineering in North America." The figures which are quoted, are certainly set down in the book, but if "an Engineer" has not forgotten all his arithmetic, and will read the calculation over again, he will see that 748 is a typographical error; and all that is said of the Great Western, by Stephenson, is that her engines "*are* said to be 450 horse power." Will "an Engineer" please to make use of the formula which he will find at the same page, and calculate for himself, the power of the Great Western. The result will vary very widely from 450. And here I beg leave to refer the writer to *one* English work of *some* value, in which he will find a part of the details of an experiment, and some opinions which do not exactly contradict my own. In "Tredgold on the steam engine and steam navigation," page 365, vol. I, in an account of the steam packet "Ruby," it is said, "the safety valves are arranged upon the plan invented and used by Messrs. Boulton and Watt, a long time since, and now generally adopted by the Engineers of London. They are so arranged that no one on board can possibly have access to them; the engine man can at pleasure open them and let the steam escape, but he has no

means by which he can keep them down, beyond the weight placed upon them by the engine maker, which weight is, as before stated 3½ pounds on the inch; and it is a curious fact, that this boat has attained the great speed named, with this small pressure, while in a variety of instances vessels from different out ports, working with high pressure steam, and with the safety valves loaded *ad libitum*, by the engineers and captains, have never been able to approach her in speed. This clearly proves, what Mr. Watt demonstrated long ago, that the most efficient, safe and economical mode of working steam engines for marine purposes, is at the pressure of from 2½ to 3½ lbs. on the inch. At the same time, for single acting pumping engines, there is no doubt an advantage gained by the judicious use of high pressure steam, say of 30 lbs. on the inch working expansively, with boilers properly constructed, but which boilers, for many reasons are not at all fit for steam vessels; in fact, almost all the melancholy accidents that have occurred to steamboats by the explosion of their boilers, have been caused by the injudicious application of high pressure boilers to marine purposes." And on the next page, it is said "the high pressure steam system, has been the means of filling the journals with those ever-occurring, heart-rending, and sickening details of hundreds and thousands that are being yearly sacrificed to ignorance and prejudice, by attempting to do that by the dangerous use of high pressure steam, which can be so well effected by steam of a low pressure, and that too at one half the consumption of fuel." The practical experiments which contradict the facts set down in the table "an Engineer" has not given us, and should he attempt to find them, he would be obliged to report *non est inventus*. The table is merely a statement in a convenient form, of such information as I was able to obtain by careful inquiry, and it may possibly contain some errors—my personal knowledge could not, of course, extend to all the cases and I was consequently compelled to rely upon the accounts received from others, or contained in printed documents. And if "an Engineer" possesses more correct information, and will show in what particulars it is incorrect, I shall with much pleasure make the necessary corrections, but until errors are pointed out, I shall suppose my information was of the right kind, obtained from the proper sources, and the table correct. But "an Engineer" might have said, with truth, that the table is *now* incorrect, although it *was* correct at the time it was compiled. The Rochester then had a 43 inch cylinder, which has since been exchanged for one of 50 inches diameter, (the boiler and other parts of the engine remaining the same.)

The result of this change is, that the steam, furnished by the boilers, is worked a lower pressure upon a larger piston, and the power of the engine increased at the same time and by the same means that the danger of explosion is diminished. That the pumping engines in Cornwall use steam of 40 lbs. pressure per inch, and work it expansively, I very well know, but I know also, that all attempts to use the same plan and pressure in double acting engines, employed in any other

kind of work have hitherto failed entirely to effect the same saving in fuel as is said to result from its use in pumping. The gentleman will find abundant proof of this in vols. I and II of the "Transactions of the Civil Engineers," the *study* of which, I beg leave to recommend to him, for he appears to have read the work carelessly or hastily, or he would never have referred to page 127 vol. I, for proof of Mr. Watts' partiality to high pressure steam. At that place is an extract from his specification filed on taking out the patent for his expansion engine. The steam mentioned there of 14 lbs. per inch, is that which would be measured by the common steam gauge with the index at zero—that is, steam just counterbalancing the pressure of the atmosphere.

The advantage of working expansively is admitted, and has never, so far as I am informed, been denied or hardly questioned,—it is safe and economical; but as I have before remarked, *all* its advantages may be obtained without venturing even into the *neighborhood* of Professor Renwick's cheap and moderate pressure of 57 lbs, per square inch.

The "Engineer's" quotations from Redfield deserve a passing notice too, because, as they stand, the conclusion must be inferred from the premises, and it ought to be stated. And in order to have the clearest view of the matter we will put it in the form of a syllogism, which will stand thus.

Steam of 7 lbs. pressure per square inch, is dangerous.

Steam of 18 lbs. pressure per square inch, is less dangerous.

Therefore, as the pressure is increased the danger is diminished. This being the legitimate conclusion, the question very naturally arises, how high must the pressure be to have the danger disappear entirely from the calculation, or if it retains its place, will it not appear with a negative sign if the pressure is sufficiently high? This question is a curious and interesting one, and I shall be pleased to have it answered by "an Engineer." Meantime, I remain

Your obedient servant,

JOHN D. WARD.

Novelty Works, May 20, 1840.

MEMOIRS OF THE MOST EMINENT AMERICAN MECHANICS—ALSO LIVES OF DISTINGUISHED EUROPEAN MECHANICS, TOGETHER WITH A COLLECTION OF ANECDOTES, DESCRIPTIONS, &C. &C. RELATING TO THE MECHANIC ARTS—ILLUSTRATED BY FIFTY ENGRAVINGS—BY HENRY HOWE.

We have had the above named work for some time before us, but have not until now had an opportunity of noticing it. Mr. Howe has aimed at making an instructive and readable book for mechanics and others interested in such memoirs—and in fact who is not interested in the narrative of the struggles, experiments, partial failures and final success of men who have, in some instances, conferred inestimable benefits upon mankind.

In the work before us it will be found, that there are lives of Fitch, Evans, Slater, Whitney, Bushnell, Whittemore, Blanchard, and Eckford,

which are either entirely original, or contain many items of interest, derived from relatives and friends of the persons themselves, and therefore of a highly interesting character.

The life of Henry Eckford is the first memoir of that distinguished man, which may be considered as the history of his mechanical career. In it we recognize the practical pen of an accomplished scholar, a near relative of Eckford, and one well qualified to defend his character and write his life.

We recommend the work to our readers, and give to them the life of Eckford in this number.

We are indebted to the kindness of a friend for the following memoir of one, whose talents and industry evinced in improveing the popular arm of our national defence, should render our country proud of ranking him among her adopted children.

Henry Eckford was born at Irvine, (Scotland,) March 12, 1775. At the age of sixteen he was sent out to Canada, and placed under the care of his maternal uncle, Mr. John Black, an eminent naval constructor at Quebec.

Here he remained for three or four years, and in 1796, at the age of twenty-one, commenced his labors in New York. His untiring industry and attention to business soon procured for him numerous friends; and the superior style in which his ships were built excited general attention. At that time the vessels constructed at Philadelphia stood highest in the public esteem; but it is scarcely too much to say, that those built by Mr. Eckford soon occupied the first rank, and gradually New York built ships bore away the palm from all competitors. Equally conversant with the theoretical as well as with the practical part of his profession, he never frittered away his own time or the money of his employers in daring experiments, which so often extort applause from the uninformed multitude. He prefered feeling his way cautiously, step by step. Upon the return of one his vessels from a voyage, by a series of questions he obtained from her commander an accurate estimate of her properties under all the casuulties of navigation. This, connected with her form, enabled him to execute his judgment upon the next vessel to be built. In this way he proceeded, successively improving the shape of each, until those constructed by him, or after his models, firmly established the character of New York built ships over those of any other port in the union.

It would be impossible, within the limits prescribed by the nature of this work, to point out the various improvements in the shape and rig of all classes of vessels suggested by the fertile mind of Mr. Eckford; and perhaps their technical details would be unintelligible to ordinary readers. It is sufficient to observe, that after his models our vessels gradually dispensed with their large and low stern frames, the details of their rigging underwent extensive changes, and in the important particulars of stability, speed, and capacity, they soon far surpassed their rivals.

Mr. Eckford had married and become identified with the interests of his adopted country when the war broke out between America and England. He entered into contracts with the government to construct vessels on the lakes, and the world witnessed with astonishment a fleet of brigs, sloops of war, frigates, and ships of the line, constructed within an incredibly short space of time. At the present day, we can scarcely appreciate the difficulties and discouragements under which operations on so extended a scale were obliged to be conducted. The country was comparatively wild and uninhabited, the winters long and severe, provisions and men, with the iron-

work, tools, rigging, and sails, were to be transported from the sea-coast; the timber was still waving in the forests, and, to crown the whole, the funds provided by the government were in such bad repute, that, to obtain current funds therefrom, Mr. Eckford was obliged to give his personal guarantee.

Under all these embarrassments, he commenced his operations with his accustomed activity and judgment, organized his plans, and offered every inducement to the interests, the pride, and the patriotism of those in his employ to labor to the extent of their ability. Encouraged by his presence and example, they entered upon their labors with enthusiasm, and neither night nor day saw a respite to their toils. The consequences were quickly apparent. A respectable fleet was soon afloat, and our frontier preserved from the invasion of a foe as active and persevering as ourselves. In allusion to these efforts, one of our intelligent citizens, Mr. Verplanck, in a discourse delivered before the Mechanics' Institute, has happily observed, "I cannot forbear from paying a passing tribute to the memory of a townsman and a friend. It is but a few days since that the wealth, talent, and public station of this city were assembled to pay honor to the brave and excellent Commodore Chauncey. Few men could better deserve such honors, either by public service or private worth; but all of us who recollect the events of the struggle for naval superiority on the lakes during the late war with Great Britain, could not help calling to mind that the courage, the seamanship, and ability of Chauncey would have been exerted in vain, had they not been seconded by the skill, the enterprise, the science, the powers of combination, and the inexhaustible resources of the ship-builder, Henry Eckford."

At the conclusion of the war, his accounts, involving an amount of several millions of dollars, were promptly and honorably settled with the government.

Shortly after this, he constructed a steam-ship, the "Robert Fulton," of a thousand tons, to navigate between New York and New Orleans. Unlike the light and fairy-like models of the present day, which seem only fit for smooth water and summer seas, she was a stout and burdensome vessel, fitted to contend with the storms of the Atlantic, and her performance, even with the disadvantage of an engine of inadequate power, far exceeded every expectation. The sudden death of her owner, in connection with other circumstances, caused her to be sold; and it is no slight commendation of her model, that when she was afterwards rigged into a sailing vessel, she became the fastest and most efficient sloop-of-war (mountiug twenty-four guns) in the Brazilian navy. It is to be regretted that the model then proposed by Mr. Eckford for sea steamers has not been followed. The vain attempt to obtain speed, without a corresponding change in the shape of the model, that would enable them to contend successfully with heavy seas, has been attended with disgraceful failures, involving an immense loss of lives.

A strong feeling of professional pride induced Mr. Eckford to accept an invitation from the Secretary of the Navy to become naval constructor at Brooklyn. He was desirous of building a line-of-battle ship for the ocean that should serve as a model for future vessels of that class, and in the Ohio, we believe, it is generally conceded such a model has been obtained. Her ports, it is true, have been altered to suit the whim of some ignorant officer, who has thus weakened her frame in order to imitate an English model, and her spars have been curtailed of their due proportions, to gratify a commissioner's fancy; but, under all these disadvantages, she is to remain a model for future constructors. Unfortunately, our marine was then encumbered, as it is now, with a board of commissioners composed of old navy officer,

who fancied that because they commanded ships they could build them,—an idea as preposterous as it would have been to have intrusted the naval constructors with their command. Under this sage administration of the affairs of the navy, six ships of the line, costing four millions of dollars, were constructed; the constructors received their orders from the sages at Washington, and each vessel, as was to have been expected, became worse than the preceding. Two of them are permitted to rot in the mud, a third has been cut down to a frigate possessing no very creditable properties, and the others, if not humanely suffered to rot, will probably follow their example.

The same signal disgrace has fallen upon our sloops of war. Under a mistaken idea of strength and stability, their frames are solid, and in many instances their leeway and headway are nearly balanced. Some of them, we are officially informed, possess every desirable property except that they are rather difficult to *steer!* Those in the least acquainted with the subject need hardly be informed that this exception, trifling as it seems, is conclusive against the model.

At the head of this board was Commodore John Rodgers, and *his* instructions and *his* orders were to be the basis of Mr. Eckford's operations. These orders, copied, for the most part, out of some exploded work on naval architecture, were wisely disregarded, although their receipt was duly acknowledged; and he has been heard to observe, that when the vessel was completed, he would have challenged the whole board to have examined and pointed out in what particulars their orders had not been implicitly obeyed. Under the orders of the commissioners, he had prepared a model which, after due examination, was graciously approved of. When Mr. Eckford proceeded to lay down the vessel, he thought fit to introduce many important changes, and the only genuine draught of the Ohio is now owned by Mr. Isaac Webb, one of the most intelligent of his pupils. The consequence, however, of these collisions between presuming ignorance and modest worth were soon obvious. Mr. Eckford resigned his commission on the day the Ohio was launched; and shortly after received an intimation, that he would never see her put in commission as long as the members of that board held their seats. This promise, as our readers are aware, was kept for eighteen years.

Shortly after this he engaged extensively in his profession; and so great and extended became his reputation, that he was called upon to construct vessels of war for various European powers, and for some of the republics of South America. Among others, he built and despatched to Columbia and Brazil four 64 gun-ships, of 2000 tons each, in the incredibly short space of eighteen months. In these cases his accounts were promptly adjusted, and he received from all parties highly honorable testimonials of his integrity, punctuality, and good faith. He subsequently received proposals to build two frigates for Greece; but as he thought he perceived, on the part of the agents, a disposition to take an unfair advantage of the necessities of that nation, he honorably and humanely declined their tempting propositions. All are aware of the disastrous and (to this country) disgraceful manner in which that business terminated.

Upon the accession of General Jackson to the presidency, he received from him an invitation to furnish him with a plan for a new organization of the navy. This was promptly furnished, and was pronounced by all who read it to be exactly what was required for an efficient and economical administration of the navy. It was not acted upon, although its adoption would have materially advanced the interests of the country. Among other novel propositions, it was recommended to remodel entirely the dockyards.

These were to be under the superintendence of superannuated commodores, who, in taking command, would relinquish their rank and make way for more active officers. The constructor at each yard was to be held responsible for the quantity and quality of work done, and only amenable to the chief constructor at Washington. This latter office, he took occasion, however, to say, he could not, under any circumstances, be persuaded to accept. He wished, in short, from what he had himself observed of the extravagance, waste, and delay at our dockyards, to place them on a civil footing, as more consonant to the feelings of the mechanics and the spirit of our institutions.

About this period he determined to prepare and publish a work on naval architecture, for which he had ample materials, and numerous draughts of vessels of almost every class. He had also set aside twenty thousand dollars to establish a professorship of naval architecture in Columbia college, and had already entered into correspondence with an eminent constructor, Mr. Doughty, whom he had intended as the first professor, when a disastrous affair occurred, involving his reputation and his ample fortune. An insurance company, in which he was largely interested, became, in the panic of the day, insolvent, and its creditors ventured, in the madness of the moment, to throw doubts on the hitherto unimpeached character of Mr. Eckford. In this they were aided by a knot of political partizans, to whom his silent, but gradually increasing popularity, (which had, long ere this, placed him in the State legislature,) was gall and wormwood. Notwithstanding he satisfactorily proved that he had lost, by stock, and other advances to save the sinking credit of the company, nearly half a million of dollars, yet his enemies affected to discredit his testimony, upon the ground that such unparalleled sacrifices were too disinterested to be credible. The termination of the investigation resulted in his complete and honorable acquittal, but the venomed shaft rankled in his kind and gentle breast to the hour of his death. It is no consolation to his numerous friends and relatives to know, that all who joined in this base conspiracy against this pure-minded and well-principled man have since paid the forfeit of their infuriated zeal, by the silent, but withering contempt of their fellow-citizens.

In 1831, he built a sloop-of-war for the Sultan Mahmoud, and was induced to visit Turkey. His fame as a skilful architect had preceded him, and he was shortly afterwards offered the situation of chief naval constructor for the empire. A field worthy of his enterprise seemed open to him. With his characteristic energy he commenced the organization of the navy yard, and laid down the keel of a ship of the line. He had rapidly entered in her construction, and had so far advanced in the favor of the sultan that preparations were in train to create him a Bey of the empire, when his labors were suddenly brought to a close by his lamented death, from inflammation of the bowels, which occurred November 12, 1832, in the 57th year of his age.

In private life, Eckford was remarkably simple in his manners and habits. Abstemious and temperate, he always possessed unclouded faculties; and his quiet attention and kindness to all under his control enabled him to secure their ready co-operation in any of his plans which required from them willing and prompt exertions. The scrupulous observance of his contracts to the minutest particular was with him a point of honor; and his dealings with his fellow-men bore rather the character of princely munificence than the generosity of a private individual. Throughout life, and amid transactions involving millions, he maintained the same unassuming habits, considering himself but the mere trustee for the benefit of others; and died as he had lived, honored and beloved by all who knew him.

An intelligent gentleman (a foreigner) who spent the greater part of last year in travelling through the several States of the Union, and by every mode of conveyance, has favored us with the following interesting article exhibiting some curious and novel comparisons and results.

TRAVELLING STATISTICS.

Since my arrival in New York in December 1838, I kept a Journal of all my travels in the United States, in which I noted 1st, the date and hour of departure from, and arrival in every place; 2d, the time spent on the journey, and the duration of all the stoppages, which gave the time of actual motion; 3d, the distance travelled over; 4th, the manner of travelling or kind of conveyance; finally, 5th, the speed exclusive of stoppages, and 6th, the rates of charges.

On the 14th of January 1840, I finished a journey through nearly all the States of the Union; having left New York on the 24th of December 1838, the whole time spent on the journey was one year and 20 days, during which I travelled

Upon railroads with locomotives	3,329 miles.
do. do. horse power	215 "
In steamboats upon rivers	2,220 "
do. do. lakes and sea	813 "
In stage coaches	2,614 "
do. sleighs	335 "
In canal boats	375 "
In a sailing vessel	136 "
In private conveyances	293 "
On foot and horseback	100 "
Total distance.	10,430 "

equal to 150 degrees of the meridian.

These 10,430 miles were travelled in 175 separate journeys, being at an average distance of 60 miles. The number of Railroads over which I passed was 64, and I took passage in 24 different steamboats. *I have not met with a single accident of the smallest kind during the whole time.*

The following statement contains accurate results as taken from my journal.

Manner of travelling, (conveyance.)		Number of miles travelled.	Time occupied exclusive of stoppages, hours.	Speed in miles per hour.	Charges for a single place (or person) whole distance.	Average charge per mile. (cents.)
Railroads	Steampower	3,329	219	15	$177	5
	Horsepower	215	36	6		
Steamboats	Upon rivers	2,220	252 1-2	9	149 50	4 9-10
	Lakes and sea	813	79 1-2	10		
Stages and sleighs		2,949	602	4 9-10	207 50	7
Canal boats		375	96	3 9-10	17 20	4 6-10
Sailing vessel		136	54	2 1-2	10	7 3-10
Private conveyances		293	42	7	36 80	12 1-2
Total.		10,330	1,381	av. 7 1-2	598 00	5 8-10

From the above it appears that of an inland voyage of over 10,000 miles, the travel upon railroads amounted to more than one-third of the whole distance.

The speed upon railroads is 50 per cent. greater than that of steamboats, to which I have however to remark, that the passage in steamboats upon rivers was nearly exclusively up stream. The speed upon common roads is less than one-third of that on railroads, the speed of canal boats only one-fourth. The average speed on the whole voyage, which is obtained

by dividing the number of miles travelled by the time of motion was 7½ miles, or half the speed on railroads.

The fare in steamboats and canal boats includes board, and is therefore the cheapest, the stage fares are 40 per cent. higher than the railroad charges, and the average rate per mile for the whole voyage was 5 8-10th cents.

The time spent in travelling, *inclusive* of stoppages, was 1,835 hours; the stoppages amounted therefore to one-fourth or 25 per cent. of the whole time occupied; and the average speed *inclusive* of stoppages, was 5 6-10th miles per hour.—*Commercial and Statistical Register.*

NEW YORK AND ERIE RAILROAD COMMENCED.

The Susquehannah Division of this great work, extending from Binghamton to Hornellsville, 117 miles, is commenced, and is contracted to be finished so that the cars will run the whole distance, on the fourth of July 1842. On the occasion of driving the *first* Pile, it was deemed proper by some of our citizens, in conjunction with the Chief Engineer and Agent of the Company, to commemmorate the event by an appropriate celebration. The Ladies, too, actuated by the same spirit which has borne onward this splendid enterprise, had conceived the idea of presenting an appropriate banner to the Company, to be elevated on the stately machine, which is destined, under the guidance of skilful operators, to bear so conspicuous a part in the execution of this grand work.

The day fixed for this "ocular demonstration" that the road will be built, was Wednesday, the 13th inst., and, as rain has been, of late, so frequent and unexpected, its dawn was looked to with intense solicitude. It came, and with unclouded brightness. All hearts were animated with this indication of the favor of a kind Providence, and every countenance beamed forth its gratitude.

At 3 o'clock, the hour designated for the commencement of the work, the ground on which the PILE-DRIVER had been erected, about one mile east of the village, was thronged with an anxious multitude—from the grey headed veteran of the Revolution, to the stripling school boy of six or seven. All were eager to witness the operations of the locomotive monster which, before known, was so much sneered at and abused. And well did the machine vindicate its majesty and power. Seizing the heavy piles with the greatest facility, with a little exercise of manual skill, they were placed in an upright position, directly under the hammers, each weighing 1000 lbs.; and as soon as adjusted, which was but the work of a minute, these ponderous weights were raised to the height of 30 feet, from whence they descended on the head of the pile, driving it home with resistless force.—This hammering continued, until it had attained a sufficient depth, when a circular saw, which projects from the machine between the piles, was put in motion, and the pile sawed off at just the required elevation. This operation is rapidly repeated—without any hindrance—only requiring the constant attention of the hands—the engine being supplied with fuel from the tops of the piles which are sawed off. It is proper to say that the *first* pile which was driven on this occasion, was also the first one which was cut, on the 20th of February last, by the agent of the Company, of which we gave due notice at the time.

We believe that none who witnessed the operation of the machine, will now doubt the permanency of the work. Indeed, we saw many who were credulous before, now exclaiming rapturously in its favor. It demonstrated with certainty, and with power, its capability of effecting all which its most sanguine friends had predicted; and we feel quite sure that it will go

on conquering and to conquer, removing all the obstacles which prejudice, party feeling, and illiberality have reared, until the New York and Erie Railroad shall be completed.

We saw in the crowd, the lengthened visages of some, who had been assiduously engaged in misrepresenting the views of the Company—denouncing their acts as hypocritical, and intended only for political effect; charging them with "supporting an idle set of vagrants along the route," and laboring with rancorous zeal to prejudice the people against them. These men are now convinced, though *against their will*, that the road will be made, and they want only a plausible pretext to take the back track. They saw around them, yesterday, the happy countenances of the many, by whom their jaundiced croakings were heeded as the idle wind, congratulating each other on the opening prospects of the southern tier, under the enlightened auspices of an Internal Improvement administration; and they saw in this "ocular demonstration," the utter discomfiture of all their plans—the dissipation, like the mists of the morning before the rising sun, of all their hopes. No wonder they were crest fallen—objects of pity, rather than scorn.

In the course of the afternoon, the presentation of the flag, spoken of above, took place. The ladies marched to the ground in procession, preceded by the Nichols Band in a splendid wagon drawn by six horses. The band, under the direction of their leader, Mr. Tuttle, a gentleman of superior musical talents, enlivened the scene with "sounds which would create a soul under the ribs of death." On reaching the designated spot, the ladies were ranged in a semi-circular form—the gentlemen in a like manner, opposite, forming a circle, with the band, and a platform for the speakers in the centre. On behalf of the Ladies, Mr. I. B. Headley then addressed Mr. Macomber, the agent of the Company, in the following terms, closing with presenting him the flag.

Mr. Macomber, *Agent of the New York and Erie Railroad Company:*

Sir—The Ladies of Owego, with their own hands have wrought this beautiful banner, and honor me with its presentation to the Company, on this joyful occasion.

The work, heretofore done in the prosecution of this noble enterprise, has not been regarded as a sure guaranty of its ultimate achievment. But, Sir, the long night of doubt and despondency has passed away. We are assembled to witness the first blow on the line of this road, which can be hailed as the signal of its certain and speedy completion. The ladies, whom I have the honor to represent, have therefore inscribed upon this banner the cheering words "ocular demonstration." Every heart in this assembled throng responds to the sentiment. In our souls we feel its truth. The preparations of this field proclaim it; this mammoth machine as it steps through our beautiful vallies, with this banner floating over it, will give a voice to this inscription; every stroke of its ponderous hammers will thunder in our ears "ocular demonstration!" and the listening hills will give back their answers in startling echoes—"ocular demonstration!"

Upon the reverse field of this banner, the fair givers have written the bold prediction, "July 4, 1842," the time appointed for the completion of the Susquehannah Division. They, Sir, do not doubt the company's ability and determination to redeem this pledge. And when the day of its redemption shall have come, it will be to us a proud recollection, that the ladies of our own beautiful village graced the first pile driver with this banner, and traced upon its ample folds this prophetic inscription.

To you, Sir, the indefatigable agent of the Company; to the experienced Chief Engineer and his assistants; to the enterprising contractor and the gentlemen connected with him, I cannot offer a more pleasing assurance of the lively interest felt by my fair constituents in the successful prosecution of your gigantic undertaking, than to remind you, that *their banner will be over you.*

They tender to the Commissioner, to the Directors, and to the Stockholders, their warm congratulations for this auspicious day. With them, they rejoice in the promised consummation of an event, which is to unite the shores of Lake Erie with the banks of the Hudson. They, and we all unite with the thousands who people these southern counties, in joyfully hailing the prospective completion of a work, which shall hurry, in swift and perpetual circulation, a mighty tide of human life and human enterprise, through this long forgotten and forsaken region.

Sir, In behalf of the young ladies of Owego, I now present to the New York and Erie Railroad Company this banner, attended with their best wishes for the speedy completion of the greatest internal improvement of our age.

Mr. MACOMBER, on behalf of the Company, acknowledged the compliment, by addressing Mr. Headley, as follows:

MR. HEADLEY—SIR: In accepting this beautiful banner, from the fair donors, allow me on the part of the New York and Erie Railroad Company, as their Agent, to return them through you our sincere and grateful thanks for the gift, and to assure them that if aught was wanting to enhance the value of the presentation, it is found in the pleasing recollection that in all our struggles to reach our present position, we have *ever* received the encouragement and smiles of the Ladies, and we feel convinced that to *this* as much as to any other cause, are we indebted for our success in overcoming all difficulties, and triumphing over all opposition.

And as we feel that the clouds of doubt and disappointment are beginning to break away, and the sun of prosperity to burst upon us, we cannot but be grateful to *all* who have stood by us in the dark days of our noble enterprise, and to pledge ourselves to them, and to all who truly wish for the increasing wealth and happiness of these Southern Counties, and of the Empire State, that nothing on our part shall be wanting to push this work to a speedy completion; and with the broadest and longest Railroad in the known world, to put another link into that iron band which will one day unite the Atlantic with the Pacific Ocean, and remain an enduring monument of American enterprise, energy and greatness.

To the ladies whom you represent, and to yourself I would again tender the thanks of the Board of Directors and of the Commissioner, of the Chief Engineer, and his assistants, of the Contractor and his operatives and of myself, and to assure you that with this banner above us, this fruitful soil beneath us, these friends around us, and the blessing of God over all, the New York and Erie Railroad must and shall be made.

The Flag presented on the occasion, exhibited on one side our National Symbol, the stars and stripes, with an inscription on the lower edge, "ocular demonstration." On the reverse, the corner usually devoted to the Stars was occupied by the figure of a Locomotive, on a Pile Road, on a blue ground. On the lower stripe, was inscribed, July 4, 1842, as designating the time when this division is to be completed.

On the close of this ceremony, it was suggested that some one of the numerous spectators, should announce their feelings on this interesting, and auspicious occasion. By intuition, as it were, all eyes were turned to E. S. Sweet, Esq. as the man on whom this task should devolve. Ever ready

to obey the wishes of the people, Mr. Sweet ascended the platform, and though wholly unprepared, electrified the audience with a speech of thrilling eloquence, of half an hours duration.

We wish we could transfer to paper this admirable address, but we cannot. We can only say it was listened to with breathless attention, and answered with a round of cheers from the congregated multitude.

The company then returned to the village—the citizens retiring to their respective homes, while the operatives attending the machine, to wit: Capt. Thomas Sharp, with his men, Albert Savory, Peleg Briggs, George Parkhurst, Benjamin Wood, Elias Phelps, and William Robinson, and the Contractor, Chief Engineer and assistants, Agent, and a few guests, repaired to the Hotel of Mr. Manning, and sat down to a sumptuous repast.

After the repast several toasts were drank, appropriate to the occasion, of which, the following have been handed in.

By C. B. Stuart, Chief Engineer. The Contractors and Operatives.—Their energetic operations on other works, is a sure guaranty that this Division of the New York and Erie Railroad will be finished July 4, 1842.

By D. O. Macomber, Agent. The New York and Erie Railroad.—The past all gloom, the present all joy; the future all hope.

By Mr. Manrow, Contractor. The Operatives.—Without them we are powerless, with them we are mighty.

By A. H. Calhoun. The Pile Driver.—It has fulfilled the expectations of its friends, and blasted the *hope* of its enemies.

By Jonathan Platt. His Excellency Wm. H. Seward, Governor of the State.—The firm friend of the New York and Erie Railroad.

By I. Spalding, Engineer. The Ladies of Owego.—May the flag which they have wrought with their own fair hands, float triumphantly over our Machine, until it reaches the western termination of its labors.

By a Guest. The Nichols Band.—Prompt at a pinch, unrivalled in their art, and ever ready to *treat* their friends.

Mr. Robert Chas. Johnson being called upon for a toast, remarked, that when the citizens of this place first convened for the purpose of petitioning the legislature for a survey of the route, of the New York and Erie Railroad, it was considered by many as wild and chimerical. He well recollected encountering a gentleman, who asked him if he really thought this work would ever be commenced, to which he replied, yes, most surely.—The gentleman then replied, in a sneering manner, "It can never be—you may as well attempt to scull a pot-ash kettle up the falls of Niagara, with a crow-bar, as to effect this visionary project." In view of what has been done, and the certainty of the speedy completion of the road, he would give,

The Pot-ash Kettle sculled up.

The company dispersed at an early hour, in good spirits, and high hopes for the future.

Royal Geological Society of Cornwall.—Boring Granite Rocks.

Mr. Prideaux observed, that a year or two since it had been suggested to him whether some chemical process could not be adopted to bore hard rocks. After some consideration, and trying several experiments, he at last found that a stream of hydrogen-oxygen gas applied to a piece of granite soon produced heat, and on application of cold water the stone became soft, and yielded to the tool. He repeated the experiment with the same result in every case. Mr. P. then explained how the gases should be mixed, and how it might be infused into the hole in the rock. He also said that a great deal of the difficulty of getting the gas at the bottom of the mines

might be obviated by very simple means. Oxygen might be superseded by common air from a pair of double bellows; and the common coal gas would be foud better than hydrogen, because it contained more inflammable matter in a given space, and it might be procured from any neighbouring gas-works, and conveyed down into a mine in a copper vessel. (Mr. Prideaux explained the kind of vessel by diagram.) If, said Mr. Prideaux, oxygen gas should be found absolutely necessary, nothing was easier to procure where there was a steam engine; they had only to get a litile iron retort, and in a country like Cornwall, abounding with manganese, they need never be at a loss for oxygen gas. He did not, however, suppose, in the present state of underground management in our mines, this plan would be adopted, but he was of opinion, should the Mining School be continued for two or three years, there would soon be many young men ready to carry it into effect.—*Mining Review.*

MEMORIAL OF SUNDRY PROPRIETORS AND MANAGERS OF AMERICAN STEAM VESSELS, ON THE IMPOLICY AND INJUSTICE OF CERTAIN ENACTMENTS CONTAINED IN THE LAW RELATING TO STEAMBOATS ASKING TO BE RESTORED TO THE RIGHTS AND PRIVILEGES WHICH BELONG TO OTHER CITIZENS ENGAGED IN NAVIGATION.

(Continued from page 313.)

No. 2.

*Schedule of Accidents to British Steam Vessels.**

No. 3.

Known accidents and Disasters to American Steamboats since the Law of 1838.

October 27th, 1838, Cynthia, Detroit river, burnt; passengers and crew saved by running on shore.
Nov. 25, Gen. Brown, Mississippi, explosion, thirty lives lost.
Jan 1839. Clarendon, Sav. and Darien, burnt; crew and passengers saved.
" Ploughboy, Mobile, sunk, on arriving at Mobile.
" Somerville, Mississippi, sunk.
Feb. Oswego, Ohio, sunk, near the mouth of the Kentucky.
" Alert, Mississippi, eruption of steam; 4 scalded.
" Alice, Pearl river, sunk.
March, Reporter, Ohio, eruption of steam; 4 scalded.
" New York, New Haven, burnt.
May, Avalanche, Ohio, eruption or collapse; 5 killed.
" Rhine, Missouri, explosion,
" Pilot, Mississippi, explosion or collapse.
" Ponchartrain, New Orleans for Tampico, explosion.
" Geo. Collier, Mississippi, eruption of steam; forty-five killed or scalded.
" Erie, Hudson river, collapse, 1 slightly wounded.
" Bee, Arkansas, sunk.
" Indian, " sunk.
" Buckeye, Mississippi, explosion; several killed or wounded.
June, Empire, Ohio, sunk.
" Massilon, " collision and eruption of steam.
" Tenessee, Cumberland river, burnt and sunk; passengers saved.
Nov. Wilmington, Mississippi, explosion; nineteen killed or wounded.
1840. Gallatin, Cumberland river, collapse; three scalded.
" Lexington, Long Island Sound, burnt; about 124 lives lost.

* One hundred and one accidents.

It may be seen that the most numerous and fatal of the accidents by steam have happened soon after the semi-annual inspections of the first of April and October. This fact will not appear surprising to practicle men; who fully understand that the care and skill of official inspectors cannot be advantageously substituted for the uncontrolled vigilance and practical knowledge and skill of those who are in the constant care and superintendence of the boats and engines; and to whom a good reputation, the desire of safety and the love of life, afford stronger and more efficient motives to correct action than can ever be furnished by the requirements or penalties of any special enactments of the legislative power.

The Cincinnati Gazette is stated to have published a list of steamboat disasters on the western waters during the last year. The sum total of losses is 40: of this number, 32 were an entire loss; snagged, 21; struck rocks, or other obstacles, 7; burnt, 5; burst their boilers, 4; run into by other boats, 3—40. There were snagged on the lower Mississippi, 11; on the Missouri, 4; on the Ohio, 4; on the Yazoo, 1; on the Red River, 1. It is remarkable that a majority of the boats were snagged on their downward trips. Lives lost, by bursting boilers, 39; by other causes, 6. Total, 45. The amount of property destroyed in boats and their cargoes, is supposed to be not less than a million of dollars.

On events like these, the provisions of statutory law can have but little influence; except as they may operate to deter the men of means, foresight and mental ability, from a business already too hazardous to their private interests, and which, most unwisely, has been made subject to the porscriptive action of the popular press and of the national legislature.

No. 4.

Losses in Ordinay Navigation and the Comparative Hazard of Navigation by Steam.—Some of the following paragraphs are taken from a communication made to the Secretaay of the Treasury by one of the memorialists.

"So alarming have been the accidents in steam navigation on our western rivers and elsewhere, as to induce a belief in the minds of some, that of all modes of conveyance this is the most hazardous. That a degree of danger has attended this mode of traveling which ought to be lessened or avoided, it were vain to deny; but when we reflect on the recent origin of the art, and the vast numbers of persons who are transported by its means, and when we also consider the exposure and comparative accidents of other modes of navigaton and means of conveyance, this impression will be materially altered, and we shall rather have cause to wonder, that under all the circumstances of the case, so small a fraction of the traveling public have become victims to this hazard. We have, indeed, a fearful list of steamboat explosions; but the sufferings and fatalites which have attended other modes of transport and conveyance, pass off with but little notice, as common occurrences, and their statistics are seldom known. Consequently, the public mind does not become excited in contemplating these casualties, which are treated only as evils which are incident to the common lot of man.

It appears from statements in the London Nautical Magazine, that the whole loss of property in British vessels by shipwreck or foundering, is estimated at 3,000,000*l.* sterling, annually; and the annual loss of life at sea at not less than 1,000 persons, not including the numerous losses of life on their own coast.

As regards our own navigation, we find the following notice in the Sailor's Magazine, for January, 1838.

Shipwrecks in the year 1837.

During the year past, there has been published in the Sailor's Magazine, a monthly list of shipwrecks which have occurred, principally of American vessels, and which have been published from time to time in various newspapers. Those only have been selected which resulted in a total loss of the vessel. The number of vessels thus reported during the year is as follows: ninety-four ships and barques, one hundred and thirty-five brigs, two hundred and thirty-four schooners, twelve sloops, and fifteen steamboats; making a total of four hundred and ninety-three vessels which have been wrecked. Of these forty-three were lost toward the close of the previous year, though the account was not published till the commencement of this; thirty-eight were lost in the month of January, fifty-four in February, twenty-four in March, thirty in April, nineteen in May, fifteen in June, forty-two in July, fifty in August, thirty-two in September, forty-three in October, forty-three in November, and six in December. The precise time when the remaining vessels were lost could not be satisfactorily ascertained.

"In the above named vessels, one thousand two hundred and ninety-five lives are reported as being lost. This, probably, is but a part of the whole, for, in many instances, the crew are spoken of as missing, and in other cases nothing is said, where, perhaps, there was a total loss."

This statement is said to comprise no deaths by steamboats, except in casses where the vessel was totally lost. On the other hand, a very large proportion of the fatal accidents in ordinary navigation, must have escaped the knowledge of the inquirer.

Now, in view of this immense waste of life, let it be considered, that in the art and practice of navigation other than by steam, the world has had the experience of more than four thousands years, and the efforts and intellect of many generations have been tasked for its greater security; while, on the other hand, *a quarter of a century has scarcely elapsed* since the powers of steam became prominently known in navigation, and we have as yet only witnessed the brief *infancy* of its application to this important purpose. Surely, then, it is not suprising that disastrous and fatal accidents should sometimes have attended its use. There is cause for astonishment, rather, that so great a degree of average security should have been attained, in so brief a period.

Each great district of our widely extended country possesses its own peculiar facilities and hazards in this species of navigation, and exhibits, also, differnt stages of improvement and security in the use of steam. In this quarter, the average degree of security enjoyed by passengers in our steamboats is certainly greater than is posesed by persons who walk the streets of our large cities. During the last five years, *millions* of passengers have been carried on the steamboats which run from this city, [New York,] and, among all these, the catalogue of deaths by steam explosions is almost inappreciable.

It is probably true, that in hardly any other circumstances in which such numbers have been placed, has the occurrence of mortality been so entirely wanting. It is with a strong sense of injustice, therefore, that those who are enagaged in this important and not always profitable avocation have found themselves selected as the objects of special and seemingly invidious legislation.

Disasters at sea, in the year 1839.

A record has been kept at the office of the American Seamen's Friend Society, during the year just closed, as in past years, of disasters at sea, so

far as they could be ascertained, which resulted in a total loss of the vessel. The following is the result:

The whole number of vessels lost is		442
Of these there were,	Ships and barques	74
do.	Brigs	124
do.	Schooners	187
do.	Sloops	16
do.	Steamboats	9
do.	Unknown	32
		884
Of these there were lost, towards the close of 1838, but were reported in 1839.		52
Wrecked in January,		26
do. February,		27
do. March,		32
do. April,		21
do. May,		29
do. June,		18
do. July,		15
do. August,		29
do. September,		64
do. October,		30
do. November,		27
do. December,		8
time unknown,		61

Added to the above entire and known losses, there has been reported thirty-seven missing vessels during the year, which, with their crews, have most probably been entirely lost, five hundred and thirty-seven lives have been reported as lost, but the loss of life is undoubtedly much greater than this, as many vessels were reported as abandoned, or bottom up, where the crew was missing, and no intelligence has been received from them. The above facts speak a language concerning the sorrows of seamen, not to be misunderstood, and they should be most solemny pondered by those who have a heart to feel and a heart to relieve.—*Sailor's Magazine*, Jan. 1840.

In the foregoing list* we have reported the loss of 84 vessels in the month of December, and the loss of 89 lives, which if added to the 89 vessels, and 90 lives lost in the great gale of the 15th of that month, and to eight other vessels reported as lost in December, in our last Magazine, and we have a total of 181 vessels, and 179 lives, lost within that month.—*Sailor's Magazine*, Feb. 1840.

In addition to the above, the Sailor's Magazine for March, 1840, also records the loss, by fire, foundering or wreck, of fifteen more vessels in 1839, and reports also, in Febuary and March, eleven vessels as missing; for the safety of which with their crews and passengers, little or no hopes are entertained. The accounts of *total loss* for 1839, so far as heard, stand as follows:

Losses mentioned in the Magazine for January,		884
do. "	" February,	173
do. and missing, "	March,	11
		1068
Deduct steam vessels included in the above		9
	Total,	1059

* This detailed list is omited here

Thus showing the total loss of more than one thousand vessels, already ascertained, and the probable loss of between one and two thousand valuable lives, all in a single year!

Are these immense losses of life and property, which had been entirely subjected to the care and control, discretion or indiscretion, of the owners of vessels and of their several commanders, while at a distance from all wholesome oversight and restraint, less worthy of the special interference of the power which is authorized to *regulate commerce*, than the persons and property embarked in steamboats, which are under the almost constant oversight of the owners and public? Or, must the result of popular misapprehensions and erroneous excitements be substituted for more sober legislation, in controlling the business concerns of this growing republic?

It is believed that the statistics which are found in the foregoing table of the steam navigation of the port of New York, may not unfairly represent *all the steam navigation of the United States*, with the exception of the Mississippi and its branches, or the waters which discharge in the Gulf of Mexico. With perhaps this exception, both the existing and the contemplated legislation appear to be almost wholly unwarranted; either by the origin, progress, or present state of the art of steam navigation.

The south-western waters, however, appear subject to greatly increased hazards; which may have resulted, mainly, from a less perfect system of practical engineering, which has been imposed either by choice or necessity; from less perfect means of outfit and repair, than are found in older states or countries; and, above all, from the greater multiplied dangers of their local navigation. It may be well questioned, however, if even here the new legislation be well adapted to the end in view. If, as is believed, there be errors in the western practice, these will doubtless be abandoned, so soon as they are practically seen and felt to be errors. But the character of the American people is greatly mistaken, if it is for a moment supposed that a combination of prescribed formulas with inquisitorial and penal enactments, will remedy evils which are beyond the reach of professional knowledge and pride, and an enlightened self-interest.

The true character or hazard of the western steam navigation is too often but little understood, or but imperfectly appreciated. It has been eloquently and justly described by the Hon. Mr. Rumsey, of Kentucky, on the floor of Congress, who vindicates the memory of the founders of steam navigation in America, and the results of their labors, as follows:

"Sir, you have no arithmetic of powers vast enough, by which to estimate the benefits of the steamboat in a pecuniary point of view alone. Their labors, too, have tended, in no small degree, *to the preservation of human life*. I am aware that the truth of the last assertion may not be universally admitted; but it will scarcely be questioned, at least by a western or south-western man, who recollects the old mode of conducting our commerce. Small as the commerce was before the introduction of the steamboat, it drew off a larger portion of the population than is now necessary to transact it, although so immensely extended. Even then, more died in the long, and exposed, and laborious voyages in keels and barges, or the exhausting return by land, under a vertical sun, than now perish by steamboat explosions. But they dropped off one by one; they sank obscurely into the grave by the way-side; or, after reaching their homes, fell victims to disease incurred by a sojourn and travel in southern climes. The consumption of life, though known to be great in the aggregate, happening so much in detail, made no public impresion. But now, every steamboat accident creates a sensation, and is pro-claimed in the universal press of the country. If the mighty commerce now in progress on the western waters, had to be

conducted in the old way, it would require the agency of so many individuals, that it would not be long before the sides of the public roads from New-Orleans to the upper States, and the banks of the great river which pours into the gulf the congregated waters of nearly half a continent, would be almost continued grave-yards."

For the American Railroad Journal, and Mechanics' Magazine.

METEOROLOGICAL RECORD FOR THE MONTHS OF JAN. and FEB., 1840.

Kept on Red River, below Alexandria, La., (*Lat.* 31,10 *N.*, *Long.*, 91.59 *W.*)

1840	Thermometer.					Remarks.
Jan.	Morn.	Noon.	Night.	Wind.	Weath.	
1	28	36	36	calm	clear	white frost and ice
2	26	42	41	NW	..	"
3	30	51	51	SW	..	"
4	47	68	59	..	..	
5	44	71	64	S	..	
6	49	68	66	..	cloudy	
7	60	71	69	..	clear	
8	52	60	57	SE	..	
9	50	59	59	..	cloudy	
10	64	56	52	..	..	
11	46	56	60	NW	clear	
12	38	50	48	..	..	white frost
13	40	50	52	N	..	
14	46	52	50	calm	cloudy	rain in the night
15	44	43	40	..	clear	
16	27	48	54	NW	..	white frost and ice
17	32	56	53	SE	..	white frost
18	34	41	40	NE	..	"
19	30	44	42	N	..	white frost and ice
20	30	60	56	calm	..	"
21	50	59	59	SE	cloudy	rain in the night
22	60	58	50	W	..	
23	36	60	40	NW	clear	white frost
24	36	50	58	calm	..	"
25	40	50	56	..	..	"
26	44	56	50	..	..	"
27	42	66	64	SE	cloudy	
28	60	62	62	..	..	rain light showers all day
29	58	68	70	..	..	
30	40	46	65	NW	clear	
31	38	38	36	NE	cloudy	light showers, drisling rain all day and night
	42	55	54	.....	.....	mean temp. of the month, 50.
Feb.						
1	34	32	32	NW	clear	white frost and ice
2	27	34	38	..	..	"
3	24	46	40	..	..	"
4	27	52	50	calm	..	"
5	48	64	66	S high	cloudy	
6	58	63	60	calm	..	showers in the morning, cloudy all day
7	52	58	58	..	..	all day
8	58	62	64	..	..	showers all day
9	58	70	70	SW	clear	
10	59	57	56	NW	..	
11	37	56	58	calm	..	white frost
12	46	69	65	SW	..	
13	59	71	68	SW high	cloudy	all day, showers in the night from west, wind
14	40	46	42	NW	clear	[high all night
15	32	54	44	..	..	
16	48	55	60	SE	cloudy	light shower all day, heavy rain at night
17	50	56	54	calm	clear	
18	46	60	67	SW	..	
19	66	76	71	SE high	..	rain in the night
20	56	60	60	calm	..	
21	57	70	72	SE	cloudy	foggy morning
22	58	76	68	..	..	rain in the night
23	66	66	70	calm	..	showers all day
24	56	64	68	..	clear	
25	54	62	64	S	cloudy	
26	62	72	70	..	clear	
27	65	73	74	..	..	
28	58	73	74	calm	..	foggy morning
29	60	72	72	..	..	
	50	61	60	.....	.....	mean temp. of the month 57